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ABSTRACT

This report provides a simplified description of flexible-modular scheduling and of several types of instructional strategies that can be advantageously applied to high school curricula. Group size, facilities, and teaching roles are considered in the overall picture of flexible-modular scheduling. Large group instruction can conserve space, teachers, and repetitious presentations of important concepts. The role of the teacher in this teaching mode is directive. In small group instruction where discussion and task orientations prevail, a teacher becomes more participatory than directive. Laboratory instruction allows further individualization because the student is permitted to work independently. Time configurations can be planned to correspond to the instructional modes used in attaining the course objectives. Complexity in the scheduling process occurs when many time patterns are used, but this can be alleviated with less structured time in the curriculum. Flexible-modular scheduling is recommended to continuously improve curriculum and instruction and to optimize learning opportunities for students in the total educational system. (LN)

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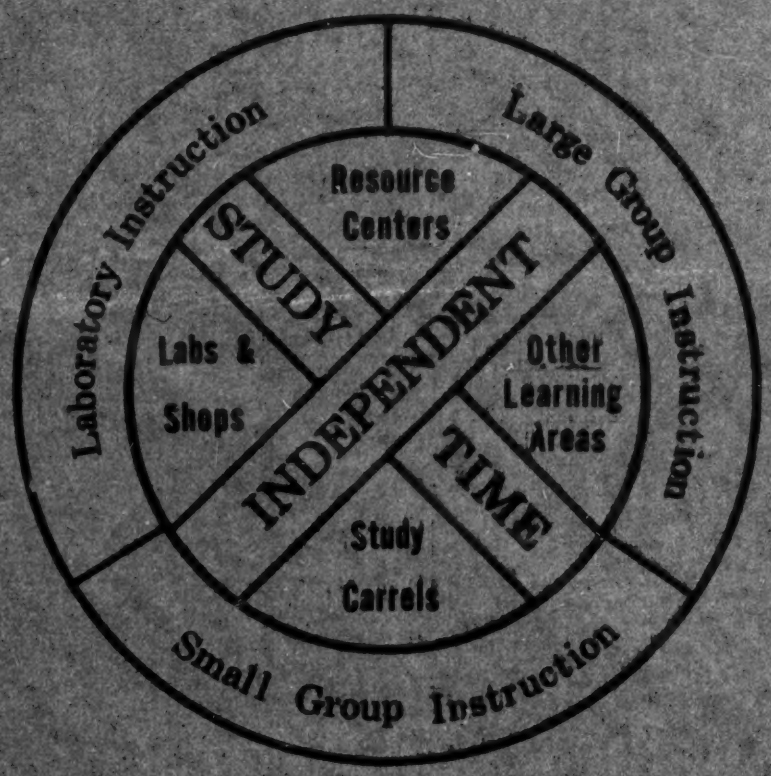
FLEXIBLE-MODULAR SCHEDULING

and

RELATED INSTRUCTIONAL STRATEGIES



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FLEXIBLE-MODULAR SCHEDULING AND RELATED INSTRUCTIONAL STRATEGIES

by

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TABLE OF CONTENTS

I. INTRODUCTION 1

II. FLEXIBLE-MODULAR SCHEDULING TERMS & COMPONENTS 2

Flexible-Modular Scheduling 2

Basic Scheduling Models 2

Scheduling Resources 6

III. INSTRUCTIONAL MODES IN FLEXIBLE SCHEDULING 11

Small Group Instruction 14

Laboratory Instruction 16

The Independent Study Program 19

IV. SUMMARY AND CONCLUSIONS 22

V. APPENDIX

VI. BIBLIOGRAPHY

Introduction

Flexible-modular scheduling is in the forefront of educational innovations. This system of scheduling is no longer in the pilot stage. Over 100 schools throughout the country have adopted this scheduling process, manually or through the aid of computer technology.

Although flexible scheduling, as a term, did not originate at Stanford University, a workable system was designed and pioneered at this institution between the years 1963-68. Professors Dwight W. Allen, Robert Bush, and Robert Oakford spearheaded the movement through a federally financed project, which eventually resulted in a sophisticated computer program for modular scheduling, followed by actual implementation of the system in approximately 102 schools in the nation and Japan.

Computer technology, of course, facilitates the scheduling process. As it can be clearly conceived, the placement of a multiplicity of time patterns into a daily or weekly time parameter is a complex procedure. Envisioning that the time dimension for each class will vary vertically and horizontally (e.g., period-length and meetings per cycle), flexible-modular scheduling is more like a cross-word puzzle as compared to a schedule composed of equal time blocks. Yet, flexible-modular scheduling without the aid of a computer has been accomplished. But again it must be emphasized that the greater the number of scheduling variables (e.g., time, students, teachers, facilities), the more difficult and time consuming the process becomes. Whatever process is used, manual or machine, it is highly advisable that the school system obtains experienced consultant help in the initial year of implementation.

It also is conceivable that merely changing the scheduling arrangement will not, in itself, result in greater learning; yet it can provide the

conditions for teachers to change their role in the application of strategies and media most appropriate and relevant to the learner. Obviously, the selection of strategies and time dimensions also can be based on particular psychological learning factors (interaction, attention span, differences in individual learning patterns, etc.).

This paper presents a simplified description of flexible-modular scheduling, coupled with several types of instructional strategies that can be advantageously applied in the high school curriculums.

Flexible-Modular Scheduling Terms and Components

Flexible-Modular Scheduling

For the purpose of this paper, the term Flexible-Modular Scheduling is defined as a scheduling system composed of a variety of time patterns, period-lengths and meetings per cycle, for courses, students, teachers and other staff personnel in a school curriculum.

A module is defined as the smallest multiple unit of time in the school curriculum schedule. This can be 15, 20, 25, 30, or any number of minutes selected as a minimum time parameter for use in the school schedule. Other flexible-modular scheduling terms used by the writer are defined in the appendix.

Basic Scheduling Models

Several types of instructional modes can be planned in various time configurations. Each of these time patterns constitutes a course phase, and all of the course phases represent the course offering. Figure 1 provides an illustration of a student's schedule.

Figure 1

STUDENT'S (sample) SCHEDULE USING 15 MINUTE MODULE

	M	T	W	TH	F
1	Course A LG	Course A SG	Course A LG	Course A SG	Course A LAB
2					
3	Course B LG		Course B LG		
4	Course B SG	IS	Course B SG	Course B LG	
5		Course C LAB		Course B SG	Course C LAB
6					
7	Course C LG		Course C LG		
8					
9					
10	L U N C H				
11	Course D LG	IS	Course D	IS	Course D LAB
12	Course D SG		Course D SG		
13					
14					
15	WORK EXPERIENCE COUNSELING-GUIDANCE INDEPENDENT STUDY (INDIVIDUALIZED INSTRUCTION)				
16					
17					
18					

It is noted that Course A includes large group instruction, which meets for two modules on Mondays and Wednesdays. The module, in this example, is 15 minutes. Further, it is observed that this course also allows small group instruction to occur for three modules on Tuesdays and Thursdays. Finally, a laboratory time arrangement of four modules is provided on Friday.

The student in this example also takes several other courses, which follow different types of time patterns. Apart from his structured time, this student is allowed several blocks of time for independent study (IS) within the total instructional time parameter, (i.e., the week).

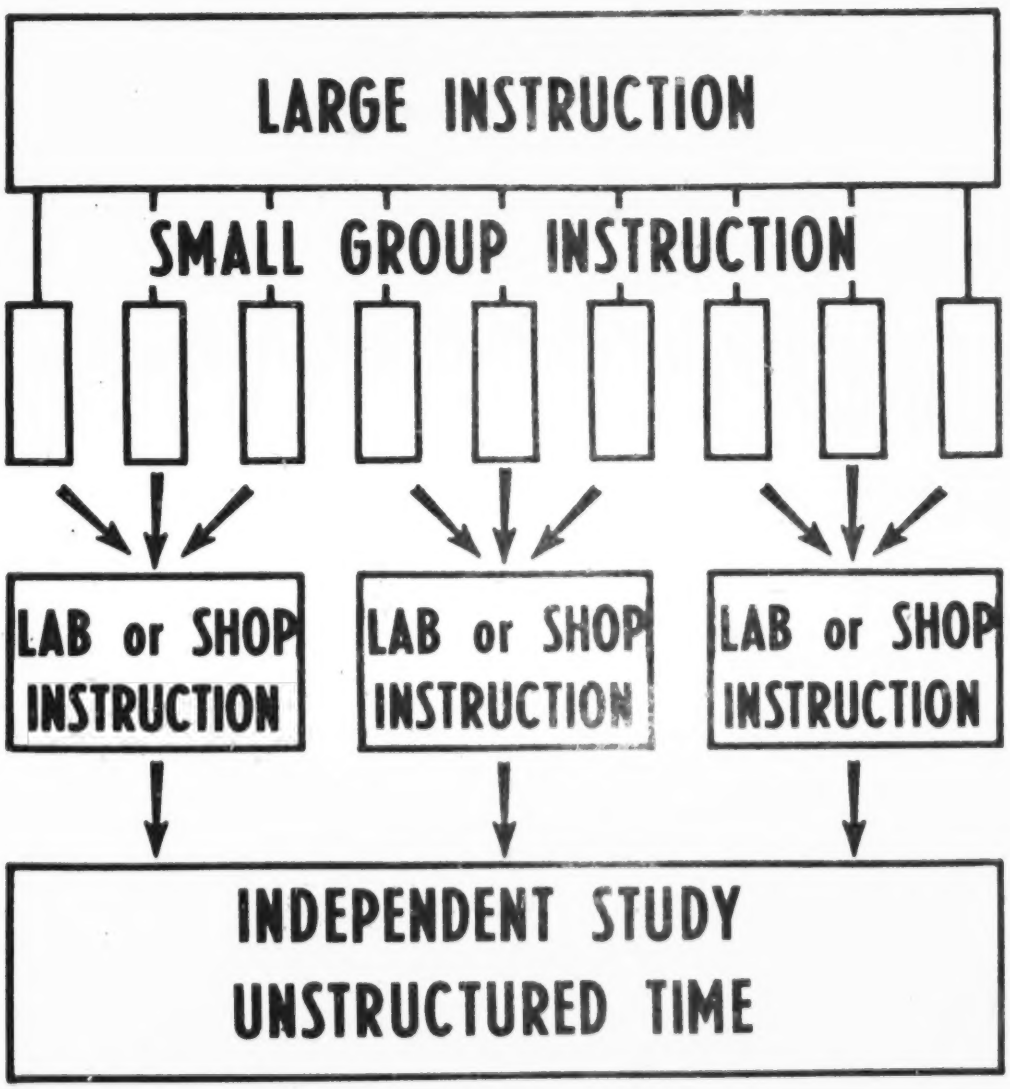
Figure 2 provides an example of group planning in terms of instructional modes. A total of ninety students are envisioned in this hypothetical course. Large group instruction, including the total course enrollment, is extended by one or more teachers in a team arrangement. Of course, where facilities to accommodate ninety pupils are unavailable, the total number can be divided into two or three large group sections.

In this illustration, it is also observed that nine small groups, with ten pupils per group, is possible for small group instruction. And the three laboratory arrangements in this illustration allow for thirty pupils, with one or more teachers. Finally, additional instruction, of an individualized nature, is possible for the entire enrollment through unstructured, independent study time.

The foregoing represents the type of planning that a team of teachers in a given subject-matter area can undertake, using multi-instructional modes relative in flexible time patterns.

Figure 2

INSTRUCTIONAL GROUPS



STUDENTS = 90
TEACHERS = 1 or more
ROOMS = 1

STUDENTS = 10 per group
TEACHERS = 1 or more
ROOMS = 1 or more

STUDENTS = 30 per lab
TEACHERS = 1 or more
ROOMS = 1 or more

STUDENTS = 90
TEACHERS = 1 or more
ROOMS = more than one

Scheduling Resources

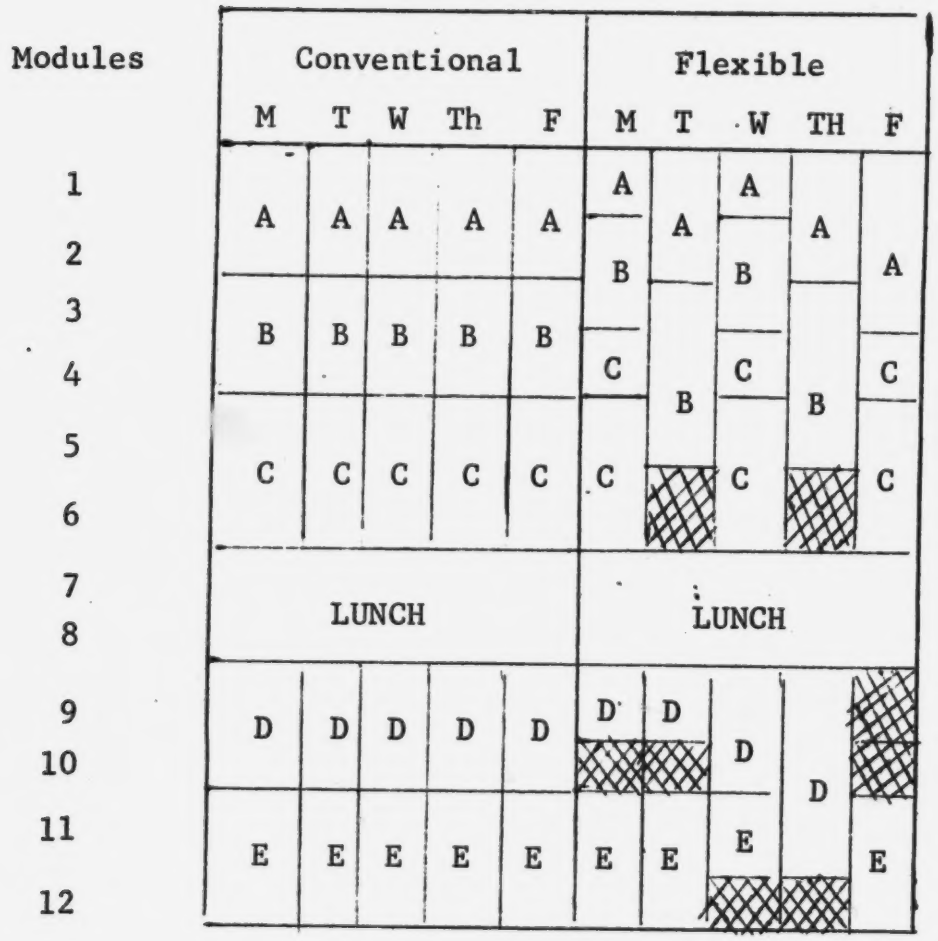
In conventional or flexible-modular scheduling, four principal resources are involved: students, teachers, facilities, and time. Student enrollment, of course, is closely related to number of sections in a course phase, number of teachers per section, and size and types of facilities. The number of teachers available has a relationship to team-teaching arrangements and role assignments in different types of instructional modes.

Availability of rooms has a bearing on the number of large group sections, as well as the number and size of small groups. Obviously, it would be advantageous to make one large group presentation instead of two, but this is dependent on room availability to accommodate the total enrollment; otherwise two or more sections for large instruction would be necessary.

Finally, time is an important variable that corresponds to teacher, student, and room availability. Thus, scheduled time patterns for each instructional mode are significantly dependent on teacher, student, and room availability. It is conceivable, then, that structured time is inversely related to student, teacher, and room availability in the scheduling process. That is, the lower the percentage of structured time in a curriculum, the higher is the availability of related resources.

Conventional schedules are usually structured for 100 percent of the school week. However, the scheduling process for this type of schedule is relatively simple because the majority of the courses use equal time blocks. On the other hand, the scheduling process in flexible-modular scheduling is more complex and difficult because of the variations in course time configurations. Figure 3 provides a simple illustration of the two scheduling plans.

Figure 3



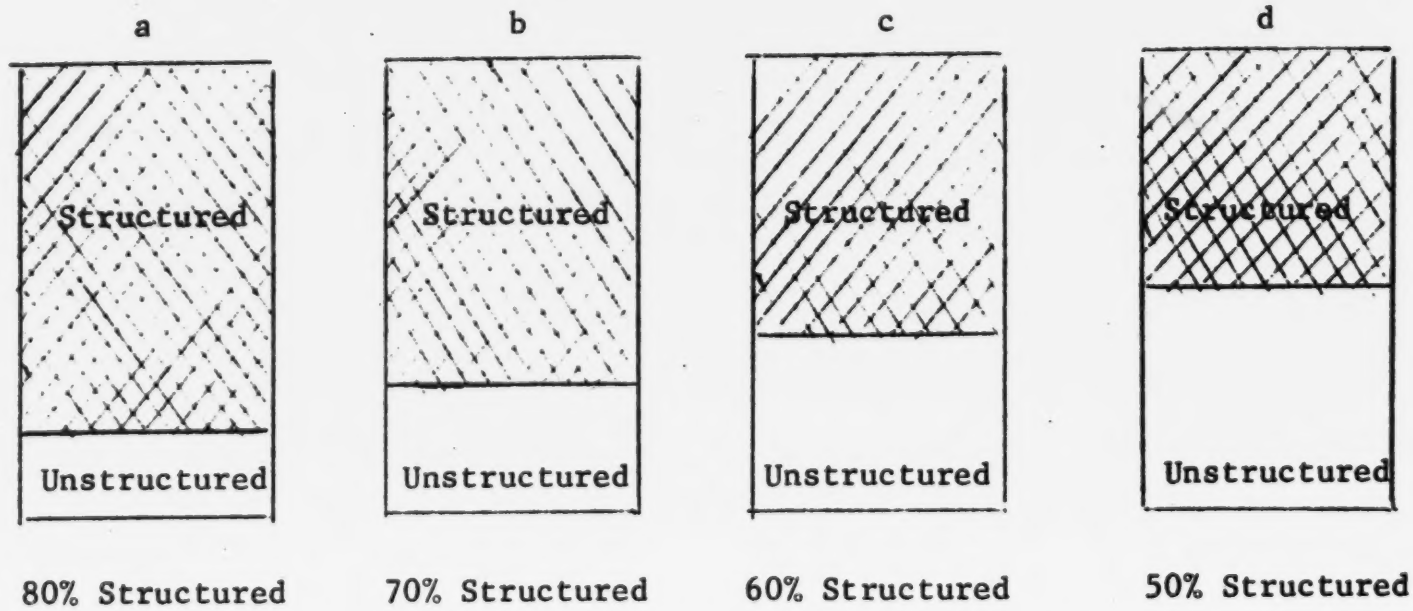
Denotes Unscheduled Time, or Independent Study

Figure 3 can easily be envisaged in terms of offerings in one curricular area, i.e., all of the social sciences or mathematics. Obviously, offerings from other curricular areas must be structured into the model. Conventional scheduling is facilitated by dividing the total student body according to grade classifications (e.g., 9, 10, 11, 12); thus, all of the English offerings (I, II, III, and IV) might be scheduled in modules 1 and 2, the social science offerings in modules 3

and 4, etc. In this manner, student and teacher conflicts can be avoided to a greater extent. A similar procedure might be followed in flexible-modular scheduling; however, the course time patterns for a given curricular area must be consistent among the different classifications of students. It is therefore conceivable that any time pattern variations within these classifications of students will increase the complexity of the scheduling processes. In essence, the more flexibility given to the planning of course time patterns, the more complex will be the scheduling process.

It is apparent that a lower percentage of structured curriculum allows a greater number of back-to-back modules for the scheduling process. In the Stanford School Scheduling project, it was found that the number of student, teacher, and room conflicts increased in respect to higher percentages of structured time. Specifically, curricula allowing 30 percent or more of unstructured time were relatively easier to schedule. Figure 4 presents four curriculum blocks, which illustrate a ratio of structured to unstructured time.

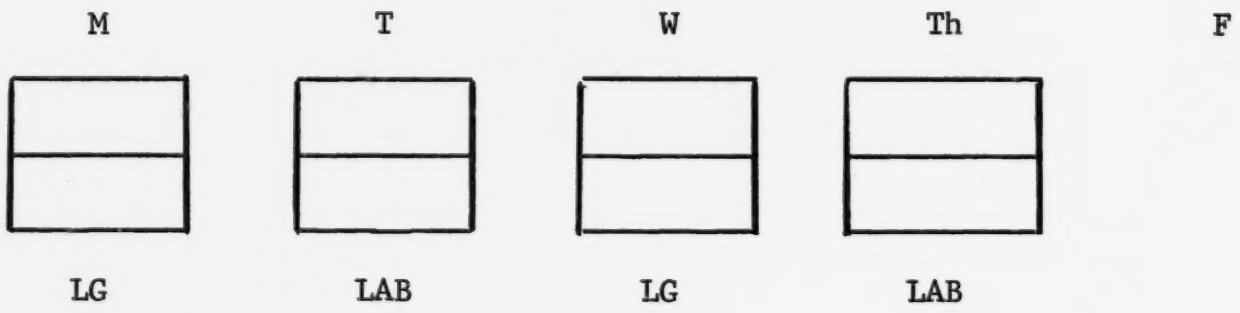
Figure 4



Two approaches have been used in curriculums where a low percentage of unstructured time is desired. One, scheduling of students and teachers is maintained above 80 percent. This can assure less than 20 percent unstructured time or independent study time. In this approach, higher teacher, student, and room conflicts are expected. Thus, adjustment of individual schedules subsequent to the initial scheduling process usually is necessary. Two, the major part of the scheduling process is limited to approximately 50 percent structured time; following this, back-scheduling of students for additional instruction (i.e., laboratories and shops) is undertaken. In essence, a more highly structured curriculum can be achieved through a double-scheduling approach. The latter scheduling approach has the potential of varying the independent study time for students during the semester or year; at the same time, the availability of facilities and teachers can remain on an open basis for independent study time.

Figure 5 illustrates the above-mentioned type of scheduling procedure in one subject-matter area.

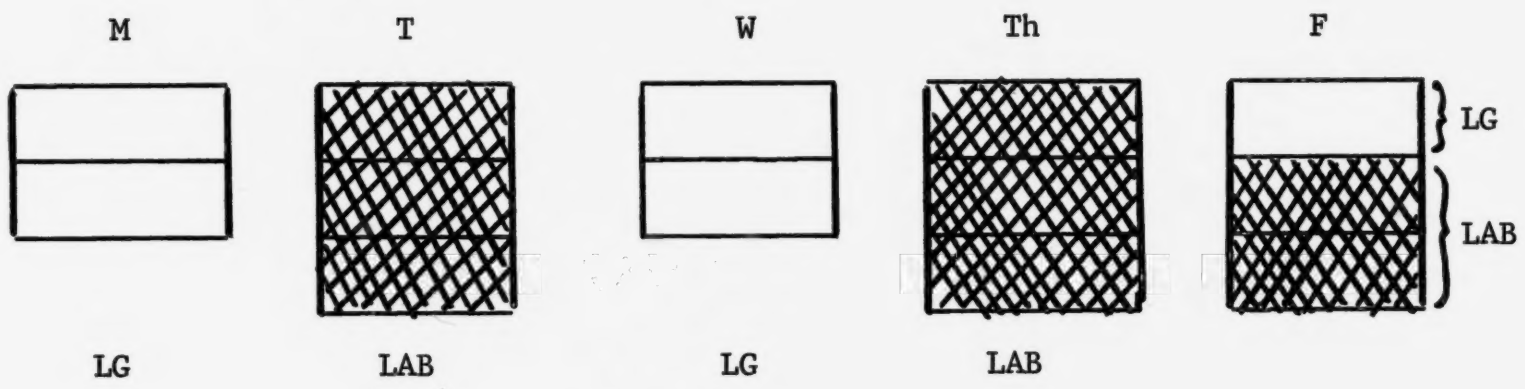
Figure 5



The foregoing example shows large group instruction for only two modules on Monday and Wednesday, followed by two modules laboratory instruction on Tuesday and Thursday. Assuming a 15 minute module, the total amount of time per day for this course is 30 minutes. Note that this represents

less than 50 percent of structured time given in a 50-minute, 5 days per week traditional schedule. If the length of the school day is equivalent to that used in a conventional curriculum, it can be concluded that consistently scheduling courses within the time parameter illustrated in Figure 5 will result in slightly less than a 50 percent time structure for the entire curriculum. Yet, if back-scheduling of students is used, the total quantity of structured time can be increased to higher percentages. A simple illustration of this scheduling effect is given in Figure 6.

Figure 6



In comparing the model in Figure 6 to that presented in Figure 5, it is noted that four additional modules of laboratory instruction and one additional module of large group instruction have been added to the initial time structure. Although the additional modules, in this simplified example, are presented consecutively to those previously scheduled, this need not be the case in a practical situation. In other words, it is conceivable that any of the additional modules could be found in any part of the total time parameter of the school schedule.

Instructional Modes in Flexible Scheduling

It was stated earlier that flexible-modular scheduling, in itself, does not guarantee improvement in instruction and learning; however, it does provide the conditions for teachers to plan and use strategies and media most appropriate and relevant to the learner.[1] Three types of instructional modes in flexible scheduling will be briefly discussed in this paper.

Large group instruction is used to present concepts and principles which apply in common to all of the students in a course. Further, psychomotor skills (e.g., writing, reading, typing, and shorthand) can be introduced through this instructional mode. Here, the teacher can use multi-stimuli, i.e., demonstrations, illustrations, lectures, debates, simulated conditions, visitations and field trips.

In large group instruction important concepts can be highlighted, emphasized, or elaborated. The teacher can make use of various media, devices, or objects to give several examples. This merely provides an opportunity for the teacher to establish a frame of reference for other instructional modes in the course, as well as to summarize and bring closure to various topics or units.

There are several noted advantages for teachers using large group instruction. First, a large group assemblage makes it possible for the teacher to make one lesson presentation, rather than repeating the same lesson to several smaller (conventional size) groups. Two, where a larger classroom is available, the reduction of lesson repetitions results in a saving of room facilities and equipment. For example, where four English teachers in a conventional curriculum are making four similar

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[1]Atilano A. Valencia, "Flexible Scheduling for Typewriting," Journal of Business Education, Vol. XLIV, No. 8, May, 1969, p. 336.

presentations, while using four rooms and four pieces of audio-visual aids, large group instruction needs only one large room and one of the four audio-visual instruments. Third, team teaching in large group instruction offers an opportunity for teacher role differentiation. The most dramatic teacher can be selected to give the lectures, the teacher with particular talents in using special audio-visual effects can present lessons involving these media, and other unique teacher talents can be used advantageously throughout the course.

Because the size of a group in large group instruction makes interaction virtually impossible, the role of the teacher is necessarily directive. Consequently, the teacher should provide the chief stimuli in this instructional setting.

It is possible for one teacher to assume the role of directing instructional strategy while another takes the role of observing the class to note cues that may be of importance in lesson planning. Of course, where video equipment is available, the latter can be accomplished without an additional teacher. And, paraprofessionals or teaching assistants, if available, may be given non-instructional assignments such as setting up audio-visual equipment, collecting and distributing materials, and cutting stencils and ditto masters.[2] This, however, does not imply non-participation of teacher-aides in particular features of the instructional scheme. The underlying scheme is to make most efficient use of specialized talents and training by using role differentiation in the instructional setting.

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[2] Ibid., p. 336

Group size is not the significant determinant for applying large group instruction. Large group instructional strategies can be used in a group of 15, as well as in a group of 300 students. Of course, as group size increases, special consideration must be given to audio and visual aids to assure adequate audio volume and perceptive range.

The length of the large group meeting is an experimental variable; in this light, the effectiveness of lectures, illustrations, or demonstrations beyond 25 minutes is especially questionable. Beggs in reflecting on lecture periods used by teachers in a flexible scheduled school in Decatur, Illinois, pointed out that the faculty responded best to periods of about thirty minutes.[3] Other observations tend to substantiate Beggs' comments. The author of this paper, in interviewing faculties in fifteen schools using the Stanford modular-flexible system, found that teachers tended to react favorably to lecture periods between 24 to 30 minutes. The 24-minute period was selected by the author for the application of large group instruction in an experimental study where psychomotor development was involved.[4] This period-length, apart from 24-30 minutes of laboratory activities, provided the basic psychomotor stimuli for the students. In essence, this time-segment was used effectively to provide the springboard for additional psychomotor practice in a laboratory setting, where the teacher assumed a different type of instructional role.

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[3]David W. Beggs, Decatur-Lakeview High School: A Practical Application of the Trump Plan (Englewood Cliffs: Prentice-Hall, Inc., 1964), p. 118.

[4]Atilano A. Valencia, "The Effects of Three Laboratory Arrangements Associated With One Type of Large-Group Instructional Arrangement in the Learning of Typewriting," (Unpublished Doctoral Dissertation), Stanford University, Stanford, California,(1968), p. 41.

The role of the student in large group instruction is primarily one of listening and observing; however, in some types of learning (e.g., those involving psychomotor responses), immediate student response to visual and/or audio stimuli can be a part of large group instruction.[5] Yet, since it is conceivable that the amount of practice to develop and master particular psychomotor responses will vary from student to student, other time arrangements and instructional settings are needed to allow for individual differences in learning rate and development.

Small Group Instruction

There are several types of small group strategies. Two are briefly discussed in this paper: the discussion small group arrangement and the task-oriented small group plan.

In the discussion small group arrangement the teacher assumes a non-directive role. Here, the teacher can play a participatory role in the discussion, but may also provide silent cues to promote student participation and spontaneous interaction. The student is allowed to interact freely through speaking, listening, initiating ideas, reflecting, inquiring, modifying, etc.

Leadership in the discussion type of small group should not be predetermined. Because knowledge and talent relative to discussing various topics and issues will vary in a hetergeneous group, it is conceivable that leadership can emerge and may be participatory.

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[5]Atilano A. Valencia, "Three Flexible-Modular Lab Arrangements in Large Group Typing Instruction," Business Education World, Vol. 49, No. 9, May, 1969, pp. 9-10.

Small group topics might be assigned to the students at large group instructional meetings; however, discussions focused on topics of current interest to students can be used as an alternate small group strategy.

The task-oriented group is based on pre-planning, with clearly specified objectives. In a task-oriented group, each participant will take an area of responsibility. The group goals apply in common, however, each participant plays a specific role in accomplishing the group task. A group of students working on a yearbook project is an example of a task-oriented group. One or two students will be responsible for layouts, one or two for special scripts, one or more for special activities, etc.

Where interaction is viewed as a significant variable, group size is a factor. The principal advantage of a small group arrangement is that group size can be maintained small enough to permit optimal interaction. Based on observations of effective small group discussions in more than 20 schools using the Stanford Flexible-Modular System, the author advocates a group size between 5-12. Beyond this size, the probability of student inhibition will increase.

The seating arrangement is another important consideration in small group instruction. A circular, face to face arrangement, can readily effect increased participation among the group members. Moreover, the teacher, as a participating member, may take a position within this arrangement. And if students attempt to direct their questions and comments to the teacher, silent cues or gestures by the teacher can be used to suggest increased group involvement.

To make effective use of the small group instructional mode teachers must develop (1) skill in accurately observing cues that reveal a student's

personal learning needs, (2) ability to induce "set" or initial inquiry by means other than dominance, (3) ability to perceive group concensus and to initiate closure and direction, and (4) skill in becoming a member of the group rather than assuming leadership and a continuous authority figure.[6]

Teachers need not always be present in a small group setting. Teachers might use pre-taped instructions, printed discussion guides, written or taped introductory statements to initiate and guide small group discussion.

Teacher familiarization with small group techniques and arrangements, as well as development of specific teaching skills relative to this instructional mode should be an important feature of the system's preservice and in-service training program. Flexible scheduling simply facilitates the application of small group strategies.

Laboratory Instruction

Laboratory instruction can be conceived as a learning condition in which the student is permitted to work independently, coupled with some individualized assistance from the teacher as the need arises. This instructional mode is in a learning condition apart from large-group presentations. In this sense, the laboratory learning condition is associated with a variety of subject-matter areas (writing, languages, shorthand, typewriting, reading, biology, etc.).

The laboratory allows more individual time differentiation in learning and practicing relative to cognitive and psychomotor development. In a conventional classroom setting, the teacher can permit an arbitrary segment of time, within the traditional 50-minute period, for individual

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[6]"Individualizing Instruction in Small Schools," A Monography by the Western States Small School Project, Salt Lake City, December, 1966, p. 21.

studying or practicing. However, since the time segment is arbitrarily determined, it may be too long for some students and too brief for others. Thus, the laboratory setting can provide a flexible time arrangement that will more nearly coincide with individual learning rates and growth patterns.

In addition to a flexible time arrangement for students to complete drills, exercises and problems assigned in the large group instructional setting, the laboratory condition offers time and facilities for pupils to explore, create and develop new techniques. It is in the laboratory where the teacher identifies and copes with problems of an individual nature. Here, special exercises, drills and problems can be prescribed to overcome student deficiencies, or to spur another upward trend in the learning curve.[7]

Although the laboratory increases the teacher's opportunity to extend individualized attention and assistance to students, this learning condition should not limit the teacher to a "tutoring" activity. Unquestionably, individualized instruction is highly appropriate and applicable in the laboratory setting, but it also suggests that the teacher, in consultation with the student can prescribe relevant materials, exercises and problems to be tackled independently.

A variety of laboratory time arrangements might be envisioned. A structured laboratory time arrangement can be constructed in terms of one or more meetings per week, with a constant or a differentiated class-period length (back-to-back modules). Another time arrangement

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[7]Dwight W. Allen, "Individualized Instruction," California Teachers Association, Vol. 61, No. 4 (October, 1965), p. 27.

may follow a similar type of schedule, but with relatively short class-period lengths (e.g., one or two 15-minute modules). Yet, the second type of arrangement suggests the possibility of open laboratory facilities for independent study or practice in associated subject-matter areas. Finally, laboratory instruction also can be offered on an open basis. This implies that students can use the laboratory for any length of time, which is generally available because of its relatively low time schedule.

The foregoing laboratory conditions were researched and tested by the author in an experimental study conducted in 1968. A psychomotor skill, namely typewriting, was used as a criterion variable. Based on a sampling population of freshmen in a flexibly-scheduled school in Southern California, the study revealed no significant differences between the three treatment conditions.[8] Specifically, the criterion variables were speed (gross-words-per-minute and mailable-words-per-minute), accuracy and production performance.

The three aforementioned laboratory conditions are, therefore, offered as practical arrangements in learning and developing a psychomotor skill. Further consideration also might be given to their applicability in other subject-matter areas. Finally, in the open laboratory condition, individualized instruction through an independent study program deserves special emphasis. Individualized instruction is, of course, advocated in structured laboratory time arrangements as well.

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[8]Atilano A. Valencia, "The Effects of Three Laboratory Arrangements Associated With One Type of Large-Group Instructional Arrangement in the Learning of Typewriting," op. cit., p. 73.

The Independent Study Program

A flexible-modular schedule composed of less than 100 percent structure opens multiple alternatives for learning through independent study. Independent study proposes learning activities apart from formal classroom settings, with or without teacher assistance and guidance, as well as on a voluntary basis.

As was previously suggested, independent study time is relative to quantity of unstructured time for students, teachers, and facilities. As unstructured time is increased, more teacher-time and facilities (e.g., laboratories, shops, and other learning centers) become available for students to undertake learning activities which are most relevant to their individual needs.

Performance curriculum in the independent study program proposes continuous learning for each individual student in a course. Because it recognizes a learning scheme based on individual differences, it can be conceptualized as a student centered model. It offers an opportunity for the student to begin at his level of comprehension or achievement, to proceed at his own learning rate, and to undertake activities with respect to his interest and motivation at various stages of the total learning scheme.

The teacher and the student also must be aware that the acceleration option is only one of three options available to the student in a continuous progress plan. The two other options are the in-depth option and the quest option. Howard describes these two options as follows:

> When the student pursues a topic beyond the basic unit, by pursuing teacher-built, pre-planned depth units, we say that the student has exercised his depth option. If he rejects the teacher-built depth unit and substitutes for it

a project which has been proposed by the student, we say that the student has exercised his quest option.[9]

It is conceivable that the three option approach is less likely to stifle student interest and initiative, while it also provides an opportunity to apply greater depth and coverage in the total learning scheme.

Time in class (e.g., one or two semesters in electronics) is irrelevent as compared to achievement based on performance criteria. For example, a student who can draw a simple half-wave rectifier circuit with all its components and electrical potentials clearly exhibits the extent to which he has achieved a behavioral objective as compared to time consumed in class.

Performance curriculum usually follows a series of prescribed instructional packages. These packages represent the teaching materials for a given number of concepts within a course. A lesson package may incorporate one or more concepts, and the length may range from one to ten pages depending on the nature of the concepts to be learned. Likewise, the number of packages in a course is dependent on the total number of concepts to be covered by all of the students.

The teacher in performance curriculum through independent study can assume the role of instructional manager. Individual guidance and direction becomes an important aspect in the instructional scheme. Pre-evaluation and post-evaluation instruments provide the teacher with much pertinent information about the student's status and progress in a course. These data give the student's level of achievement, areas of deficiency

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[9]"Developing Student Responsibility for Learning," A presentation to the 50th Annual Convention of the National Association of Secondary School Principals. Eugene R. Howard, Director, Institute for Development of Education Activities. National Association of Secondary School Principals, Washington, D.C., 1966, p. 242.

and strength, rate of learning in given lessons, ability to apply concepts in psychomotor activities, ability to follow directions given in the materials, creativeness and independent learning. They provide guidance information so the teacher can help the student select more advanced lessons in the instructional program.

The student's role in an individualized program is relatively independent of teacher input. The major stimuli for the student is not only via large group presentations, but also through multi-media available to the individual learner in the educational setting.

Individualized instruction in the independent study program does not dismiss the possibility of teacher assistance on a one-to-one basis. Here, two philosophical instructional approaches can be envisioned. First, the teacher may extend individual assistance only upon student request; or second, the teacher, cognizant of individual deficiencies and strengths, may voluntarily extend individual assistance as needs are revealed. The author proposes a combination of the two approaches with respect to various levels and degrees of needs among individual students as they proceed through the course.

Individualized learning in the independent study program can be increased through the use of multi-media by individual students. Learning materials (paper-pencil), programmed machines and manuals, film loops, slides, recording tapes, charts, films, etc., can be made available in laboratories, shops, resource centers, libraries, and other learning areas.

The success of the independent study program principally depends on student and teacher involvement during unstructured time. And this is significantly related to course and individual goals clearly revealed

in the structured segment of the curriculum. Further, teaching responsibilities and skills in carrying forth the independent study program can be incorporated in the preservice and in-service training program. From this type of exposure, the teacher can more effectively familiarize students with the primary objectives of the independent study program. Student involvement in the independent study program can, therefore, be increased through continuous emphasis and participation by teachers.

Summary and Conclusions

As has been previously stated, flexible scheduling is not an end itself, but it is clearly a means of changing the curriculum time arrangement to facilitate the application of various teaching modes. The principal instructional modes discussed in this paper are large group instruction, small group instruction, and individualized instruction. Incorporated with these modes are multi-strategies and media, which provide various stimuli for spurring learning in the educational scene.

Different types of time configurations can be planned to correspond, as nearly as possible, to the instructional modes used in carrying forth the course objectives. Group size, facilities, and teaching roles are factors to be considered in planning strategies and time patterns.

The greater the number of time patterns given in a school schedule, the more complex is the scheduling process. And where a high percentage of structured time is used in the curriculum, the more complex and difficult is the scheduling.

The initial scheduling process can commence with a low structured time schedule to facilitate the scheduling process, especially in schools where manual scheduling is used. Back scheduling can be applied subsequent to the initial scheduling process to effect an increase in structured time. Computer programs are now available to assist administrators in scheduling courses in terms of various time dimensions. For example, the Stanford School Scheduling Program, now available through Educational Coordinates in Palo Alto, California, offers manuals, computer processing and consultants to school systems undertaking variable-modular scheduling.

Other agencies such as the Southwestern Cooperative Educational Laboratory in Albuquerque, New Mexico, also has personnel who can conduct training institutes for teachers on innovative strategies associated with modular scheduling. Additionally, micro-teaching techniques are offered to assess the effectiveness of different strategies and time configurations. Thus, a school system can revise its modular schedule bi-annually or annually in terms of information gathered through its assessment system.

In this light, flexible-modular scheduling is recommended as a means to effect continuous curriculum and instructional improvement; which, in turn, optimizes learning opportunities for students in the total educational system.

APPENDIX

Glossary of Terms

Periods Per Meeting

Periods Per Meeting represents a selected segment of time for a class or group meeting. For example, if a 15-minute module is used in the schedule, three periods per meeting or three modules, would actually represent 45 meetings for a given class session.

Meetings Per Cycle

Meetings Per Cycle can be described as the total number of meetings for a class group in a given cycle, based on a time parameter of a given number of days (5, 10, etc.). Thus, frequency of meetings follows a predetermined cycle.

Course-Phase

A course-phase represents a given time configuration, with reference to an instructional mode, in a total course instructional time pattern. For example, large group instruction, small group instruction, laboratory instruction, etc., may be given different time arrangements within a given course.

Course

A course is composed of several course phases, which incorporates different time arrangements based on various types on instructional modes. The course content, of course, focuses in a particular subject-matter area (e.g., General Mathematics, Beginning Typing, and Government).

Class Section

A class section in modular scheduling refers to one of several possible groups in a course phase. For example, large group instruction, or Phase 1, may include two sections of 60 students; while small group instruction, or Phase 2, may be divided into 10 sections, composed of 12 students per section.

Teachers per Section

Teachers per Section refers to a team arrangement in which one or more teachers are assigned to teach in a given class section.

Teachers per Course

Teachers per Course simply refers to the total number of teachers from a curricular area assigned to teach a complete course. These teachers are assigned to one or more sections in one or more course phases.

Students per Section

Students per Section is defined as the total number of students desired per class section for a given course phase.

Number of Class Sections

The number of class sections can be computed by dividing the total number of students in a course phase by the number of students desired per section. Example: 60/10 = six sections of ten students per section.

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